PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-043796

(43)Date of publication of application : 16.02.2001

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(51)Int.Cl. H01J 9/227
B44C 1/17

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(54) HEAT-SENSITIVE TRANSFER FILM AND USING METHOD FOR THE SAME

(57)Abstract:

PROBLEM TO BE SOLVED: To easily form a color filter layer or a phosphor layer with the few number of processes by constituting a heat-sensitive film from a photosensitive phosphor layer having prescribed colors, color filter layer having the same color, and a photosensitive adhesive layer.

SOLUTION: In a heat-sensitive transfer film 10, a cushion layer 7 made of thermoplastic resin, a photosensitive phosphor layer 5, a color filter layer 4 and a photosensitive adhesive layer 3 are formed sequentially on a base film 6 as a support body, and a cover film 8 is formed on the front surface to protect the photosensitive adhesive layer 3. An antistatic layer 9 is formed on the back surface of the base film 6 to prevent electrification in peeling. The photosensitive adhesive layer 3 contains photosensitive materials to be hardened by the irradiation of the ultraviolet ray, and the

photosensitive adhesive layer 3 can be patterned by being exposed and developed. Since a photosensitive material containing no chrome can be used, there is the advantage that no discharge of chrome materials occurs.

LEGAL STATUS [Date of request for examination] 07.03.2006
[Date of sending the examiner's decision of rejection]
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]
[Date of final disposal for application]
[Patent number]
[Date of registration]
[Number of appeal against examiner's decision of rejection]
[Date of requesting appeal against examiner's decision of rejection]
[Date of extinction of right]

CLAIMS

[Claim(s)]
[Claim 1] The thermosensitive imprint film characterized by having the photosensitive fluorescent substance layer of a predetermined color, the color filter layer of the same color, and a photosensitive glue line at least on a base film.
[Claim 2] Operation of the thermosensitive imprint film characterized by imprinting putting heat and a pressure with an imprint roller on a base film on the thermosensitive imprint film which has the photosensitive fluorescent substance layer of a predetermined color, the color filter layer of the same color, and a photosensitive glue line at least.
[Claim 3] The thermosensitive imprint film characterized by having the photosensitive

predetermined fluorescent substance layer and the photosensitive predetermined glue line of a color at least on a base film.

[Claim 4] The thermosensitive imprint film characterized by having the predetermined color filter layer and the photosensitive predetermined glue line of a color at least on a base film.

[Claim 5] Operation of the thermosensitive imprint film characterized by imprinting putting heat and a pressure with an imprint roller on a base film on the thermosensitive imprint film which has the photosensitive predetermined fluorescent substance layer and the photosensitive predetermined glue line of a color at least.

[Claim 6] Operation of the thermosensitive imprint film characterized by imprinting putting heat and a pressure with an imprint roller on a base film on the thermosensitive imprint film which has the predetermined color filter layer and the photosensitive predetermined glue line of a color at least.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the thermosensitive imprint film used for formation of the phosphor screen in display units, such as a color cathode-ray tube, and its operation.

[0002]

[Description of the Prior Art] In recent years, the demand of a color cathode-ray tube raising contrast and color purity in a quality side with the shift to enlargement and the formation of a flat screen is increasing. On the other hand, various proposals as a configuration which raises contrast are made.

[0003] Here, the mimetic diagram showing the fluorescent substance of three colors formed on the panel glass of a color cathode-ray tube is shown in drawing 6 . On the panel 50, blue, green, and the fluorescent substance layers 51B, 51G, and 51R corresponding to three red colors are arranged, respectively, and the light absorption layer 52 which consists of carbon is formed among these fluorescent substance layers 51B, 51G, and 51R.

[0004] They are LB, LG, and LR, respectively about the luminous intensity irradiated in drawing 6 corresponding to blue, green, and the fluorescent substance layers 51B, 51G, and 51R of three red colors, using the permeability of a panel 50 as T. It carries out. Here, fluorescent substance layer 51G with a green center are observed, and it is L0 in strength to these fluorescent substance layer 51G [green]. It is RG about the reflection factor which outdoor daylight hits and reflects. When it carries out, it is the transmitted

light L1. Reinforcement (it is equivalent to brightness) is the reflected light L2 of LG xT and outdoor daylight. Reinforcement is expressed with L0 xTxRG xT. The same is said of other fluorescent substance layers 51B and 51R.

[0005] In this case, contrast can be expressed as follows.

Contrast = transmitted light L1 The reflected light L2 of reinforcement/outdoor daylight On-the-strength =LG xT/L0 xTRG xT=LG/L0 xRG xT[0006] From this formula, in order to improve contrast, it is possible to make the permeability T of a panel 50 small first. How to make color for example, panel glass, reduce reflection of outdoor daylight, and raise contrast there can be considered, and the color cathode-ray tube of high contrast which used for panel glass the dark glass whose permeability T is 40 - 50% is commercialized.

[0007] However, the approach of improving contrast using dark glass is equivalent to so to speak forming a black filter, and since luminescence of a fluorescent substance is absorbed with panel glass and brightness falls, it is not desirable.

[0008] In addition, the approach of making the pigment of the luminescent color of that fluorescent substance and the same color adhere to the front face of a fluorescent substance particle, and raising contrast is proposed, and also by this approach, when luminescence of a fluorescent substance is absorbed by the pigment of the same color, brightness will fall.

[0009] Then, the method of preparing the color filter layer of the luminescent color of a fluorescent substance and the same color between panel glass and a fluorescent substance layer is proposed (reference, such as JP,64-7457,A, JP,5-275006,A, JP,5-266795,A, and JP,9-274103,A). That is, as shown in drawing 7 , the color filter layers 53B, 53G, and 53R of the same color are formed in the bottom of each fluorescent substance layers 51B, 51G, and 51R, respectively.

[0010] By forming these color filter layers 53B, 53G, and 53R, since permeability becomes what compounded the permeability T of panel glass 50, and the permeability of the color filter layers 53B, 53G, and 53R, it falls a little.

[0011] In this case, although brightness also falls a little, it is a reflection factor RG by the color filter layers 53B, 53G, and 53R more than it. It is the reflected light L2 in order to fall. Reinforcement is controlled and a contrast ratio can be improved. therefore, by this approach, both color purity and contrast can be boiled markedly, and can be raised.

[0012] In addition, when you want to compensate the fall of the brightness by having formed the color filter layers 53B, 53G, and 53R, they are an electron beam LB, LG, and LR. He is trying to raise reinforcement.

[0013]

[Problem(s) to be Solved by the Invention] By the way, when an above-mentioned color filter layer was prepared, the process which forms a color filter layer with slurry method needed to be performed, and the process which uses slurry method and forms a

fluorescent substance layer on a color filter layer after an appropriate time needed to be performed.

[0014] After this slurry method forms the slurry which distributed the ingredient and the photosensitive component of a color filter layer or a fluorescent substance layer and applies this slurry, it is the approach of drying and forming a layer, and carrying out patterning by exposure and development further, and forming the predetermined color filter layer or predetermined fluorescent substance layer of a pattern.

[0015] However, since it did not fully harden in the thickness direction of a red color filter layer in order to absorb ultraviolet rays, in case ferric oxide (transparence rouge) and the ** cadmium selenide which are used as red pigments in case a red color filter layer is formed are exposure, a pattern was not able to flow in development and the pattern of a direct red color filter layer was not able to be formed with slurry method.

[0016] Then, the red color filter layer needed to be formed using the so-called reversal development. That is, after forming a resist layer extensively, exposure and development are performed so that parts other than a red pixel (a blue pixel, a green pixel, and carbon stripe in the meantime) may remain, and patterning of the resist layer is carried out. The slurry which contains the ingredient of a red color filter extensively on it is applied, and it dries. Then, lift off of the ingredient of the red color filter on it is carried out with a resist layer. Thereby, a red color filter layer can be formed only in the field of the pixel of red without a resist layer.

[0017] Thus, since quite many routing counters are needed in addition to the production process of a color cathode-ray tube which does not carry a color filter in order to carry a color filter in a color cathode-ray tube, an activity is very complicated and there is a fault to which a manufacturing cost becomes high.

[0018] And in a production process, since the burden placed on the carbon stripe 52 already formed ahead of the color filter when the process of spreading of a slurry, desiccation, exposure, development, and desiccation increases increases, the defect by aggravation of the linearity of the edge which is the pixel obtained, and generating of a chip occurs, and the defect by adhesion of dust or mixing of a foreign matter is also generated.

[0019] Moreover, when the polyvinyl alcohol (PVA)-ammonium dichromate (ADC) or the polyvinyl alcohol (PVA)-sodium dichromate (SDC) was used for the slurry for color filters as a photosensitive component, the wastewater which contained chromium by the production process was generated so much, and there was a problem that waste-water-treatment cost started.

[0020] In this invention, the thermosensitive imprint film which can form a color filter layer and a fluorescent substance layer by the small routing counter easily and its operation, and the manufacture approach list of a display are provided with the manufacture approach of a cathode-ray tube to the problem mentioned above.

[0021]

[Means for Solving the Problem] The thermosensitive imprint film of this invention has the photosensitive fluorescent substance layer of a predetermined color, the color filter layer of the same color, and a photosensitive glue line at least on a base film.

[0022] According to the configuration of the thermosensitive imprint film of above-mentioned this invention, by having the photosensitive fluorescent substance layer of a predetermined color, the color filter layer of the same color, and a photosensitive glue line at least, a fluorescent substance layer and a color filter layer can be imprinted to coincidence by hot printing, and a fluorescent substance layer and a color filter layer can be formed easily. Moreover, patterning can be easily carried out by performing an imprint postexposure by having a photosensitive fluorescent substance layer and a photosensitive glue line.

[0023] The operation of the thermosensitive imprint film of this invention is imprinted putting heat and a pressure with an imprint roller on a base film on the thermosensitive imprint film which has the photosensitive fluorescent substance layer of a predetermined color, the color filter layer of the same color, and a photosensitive glue line at least.

[0024] According to the above-mentioned this invention approach, by imprinting putting heat and a pressure with an imprint roller, a fluorescent substance layer and a color filter layer can be imprinted to coincidence, and a fluorescent substance layer and a color filter layer can be formed easily.

[0025] The thermosensitive imprint film of this invention has the photosensitive predetermined fluorescent substance layer and the photosensitive predetermined glue line of a color at least on a base film.

[0026] According to the configuration of the thermosensitive imprint film of above-mentioned this invention, by having the photosensitive predetermined fluorescent substance layer and the photosensitive predetermined glue line of a color at least, a fluorescent substance layer can be imprinted by hot printing, and a fluorescent substance layer can be formed easily. Moreover, patterning can be easily carried out by performing an imprint postexposure by having a photosensitive fluorescent substance layer and a photosensitive glue line.

[0027] The thermosensitive imprint film of this invention has the predetermined color filter layer and the photosensitive predetermined glue line of a color at least.

[0028] According to the configuration of the thermosensitive imprint film of above-mentioned this invention, by having the predetermined color filter layer and the photosensitive predetermined glue line of a color at least, a color filter layer can be imprinted by hot printing, and a color filter layer can be formed easily. Moreover, patterning can be easily carried out by performing an imprint postexposure by having a photosensitive glue line.

[0029] The operation of the thermosensitive imprint film of this invention is imprinted putting heat and a pressure with an imprint roller on a base film on the thermosensitive

imprint film which has the photosensitive predetermined fluorescent substance layer and the photosensitive predetermined glue line of a color at least.

[0030] According to the above-mentioned this invention approach, by imprinting putting heat and a pressure with an imprint roller, a fluorescent substance layer can be imprinted and a fluorescent substance layer can be formed easily.

[0031] The operation of the thermosensitive imprint film of this invention is imprinted putting heat and a pressure with an imprint roller on a base film on the thermosensitive imprint film which has the predetermined color filter layer and the photosensitive predetermined glue line of a color at least.

[0032] According to the above-mentioned this invention approach, by imprinting putting heat and a pressure with an imprint roller, a color filter layer can be imprinted and a color filter layer can be formed easily.

[0033]

[Embodiment of the Invention] This invention is a thermosensitive imprint film which has the photosensitive fluorescent substance layer of a predetermined color, the color filter layer of the same color, and a photosensitive glue line at least on a base film.

[0034] This invention is the operation of the thermosensitive imprint film imprinted while putting heat and a pressure with an imprint roller on a base film on the thermosensitive imprint film which has the photosensitive fluorescent substance layer of a predetermined color, the color filter layer of the same color, and a photosensitive glue line at least.

[0035] This invention is a thermosensitive imprint film which has the photosensitive predetermined fluorescent substance layer and the photosensitive predetermined glue line of a color at least on a base film.

[0036] This invention is a thermosensitive imprint film which has the predetermined color filter layer and the photosensitive predetermined glue line of a color at least on a base film.

[0037] This invention is the operation of the thermosensitive imprint film imprinted while putting heat and a pressure with an imprint roller on a base film on the thermosensitive imprint film which has the photosensitive predetermined fluorescent substance layer and the photosensitive predetermined glue line of a color at least.

[0038] This invention is the operation of the thermosensitive imprint film imprinted while putting heat and a pressure with an imprint roller on a base film on the thermosensitive imprint film which has the predetermined color filter layer and the photosensitive predetermined glue line of a color at least.

[0039] Drawing 1 shows the outline block diagram (sectional view) of a thermosensitive imprint film as a gestalt of 1 operation of this invention.

[0040] The covering film 8 is formed and this thermosensitive imprint film 10 is constituted by the front face, in order to carry out sequential formation of the cushion layer 7 which consists of thermoplastics, the photosensitive fluorescent substance layer

5, the color filter layer 4, and the photosensitive glue line 3 on the base film 6 used as a base material and to protect the photosensitive glue line 3. Moreover, the antistatic layer 9 is formed in the rear face of a base film 6 for the electrification prevention in the case of exfoliation.

[0041] In case it is used, after exfoliating the covering film 8 first, it imprints by heating and pressurizing with an imprint roller, and a base film 6 and the cushion layer 7 are exfoliated. That is, three layers, the photosensitive fluorescent substance layer 5, the color filter layer 4, and the photosensitive glue line 3, become the part 11 which finally remains.

[0042] a base film 6 -- for example, about 75 micrometers and the cushion layer 7 -- for example, let [about 40 micrometers and the photosensitive fluorescent substance layer 5 / about 10 micrometers and the color filter layer 4] about 1 micrometer and the covering film 8 be the thickness of about 50 micrometers for about 3 micrometers and the photosensitive glue line 3.

[0043] The photosensitive glue line 3 is constituted including the photosensitive ingredient hardened by UV irradiation. Since there is photosensitivity, exposure and development can be performed and this glue line 3 can be patternized.

[0044] The color filter layer 4 is constituted by the ingredient of the color filter of a predetermined color, for example, a color pigment, and a photosensitive ingredient or nonphotosensitivity water soluble resin.

[0045] Among these, when using nonphotosensitivity water soluble resin, in case patterning is carried out by the photosensitivity of the photosensitive glue line 3 which is an up-and-down layer, and the photosensitive fluorescent substance layer 5, patterning also of the color filter layer 4 is made to be carried out to coincidence.

[0046] In addition, in the red color filter layer 4, the ingredient (it will absorb), for example, ferric oxide, which does not let the ultraviolet rays mentioned above as a color pigment pass, Cd (S, Se), etc. can be used.

[0047] The photosensitive fluorescent substance layer 5 is constituted by the fluorescent substance ingredient which emits light in a predetermined color, and the photosensitive ingredient.

[0048] In addition, as a photosensitive ingredient, it is desirable to use the sensitization agent of SBQ (conversion polyvinyl alcohol which added photosensitive radicals, such as a still BAZORIUMU radical), or diazo **, for example. Since these sensitization agents do not contain chromium, when negatives are developed, wastewater containing chromium is not generated.

[0049] In addition, in using the thermosensitive imprint film 10 corresponding to two or more colors, respectively, it prepares the thermosensitive imprint film 10 which consists of the same laminated structure with having been shown in drawing 1 for every color.

[0050] And the display with which the laminating of a fluorescent substance layer and the color filter layer was carried out, and the pixel of each color was constituted can be

formed by using the thermosensitive imprint film 10 of the gestalt of this operation for the display (display) of a color cathode-ray tube, a plasma display, etc.

[0051] Next, the manufacture approach of a color cathode-ray tube of having the phosphor screen which formed the color filter layer using the thermosensitive imprint film 10 shown in drawing 1 is explained. Here, the case where the color filter layer of these 3 color is formed is explained using the thermosensitive imprint film 10 corresponding to three colors of blue, green, and red, respectively.

[0052] First, the light absorption layer 2 of the shape of the black shape of a stripe and a dot is conventionally formed in panel glass 1 inside by the well-known approach. Namely, after applying resist liquid to panel glass 1 inside and making it dry this, the resist layer of transparence is formed in the location corresponding to each color of blue, green, and red by carrying out warm water development and drying with 20-25-degree C warm water, by making it expose through the color sorting electrode, for example, the shadow mask, used for a color cathode-ray tube. And after applying carbon slurry on this, drying this and making a carbon layer bind, by washing with hydrogen peroxide solution, a resist layer and the carbon layer on it are removed completely (reversal development), and the light absorption layer 2 of a predetermined pattern is formed (refer to drawing 2 A).

[0053] Next, as it exfoliates and the covering film 8 of the imprint film 10 for blue pixel formation is shown in drawing 2 B, and a glue line 3 and the light absorption layer 2 are piled up, with an imprint roller, it heats and pressurizes and laminates. The conditions of a lamination are 120 degrees C and a pressure about temperature 1.3kg/cm2 It carries out. And between the cushion layer 7 and fluorescent substance layer 5B is made to exfoliate, and a base film 6 and the cushion layer 7 are removed. Thereby, as shown in drawing 2 C, blue color filter layer 4B and blue fluorescent substance layer 5B are formed through a glue line 3 on the light absorption layer 2.

[0054] Next, as shown in drawing 2 D, a blue picture element part is exposed from the interior of panel glass 1 (inside side) through the electrode 21 for color sorting, for example, the shadow mask, used for this cathode-ray tube. Then, the blue pixel which consists of blue color filter layer 4B and blue fluorescent substance layer 5B as shown in drawing 3 E is formed by drying, after 20-25-degree C warm water removes an unexposed part completely in warm water development, for example.

[0055] Also in case the following green pixel is formed, similarly, the thermosensitive imprint film 10 for green pixel formation is heated and pressurized, and is laminated with an imprint roller, from on a blue pixel, a base film 6 and the cushion layer 7 are removed, and imprint grant of green color filter layer 4G and green fluorescent substance layer 5G is carried out through a glue line 3. As shown in drawing 3 F, a green picture element part is exposed for this from the interior of panel glass 1 through a shadow mask 21. Then, by drying, after warm water development removes an unexposed part completely, for example with 20-25-degree C warm water, as shown in

drawing 3 G, the green pixel which consists of green color filter layer 4G and green fluorescent substance layer 5G is formed.

[0056] Like a blue pixel and a green pixel, at the last, the thermosensitive imprint film 10 for red pixel formation is heated and pressurized, and formation of a red pixel laminates it with an imprint roller, from on a blue pixel and a green pixel first, removes a base film 6 and the cushion layer 7 at it, and carries out imprint grant of red color filter layer 4R and the red fluorescent substance layer 5R through a glue line 3 at it.

[0057] As red color filter layer 4R mentioned above, in order to absorb the light used for exposure, the exposure in this case performs external exposure 23 from the outside of panel glass 1 on the whole surface while performing internal exposure 22 from the interior of panel glass 1 to a red picture element part through a shadow mask 21, as shown in drawing 4 H. Since the light of the external exposure 23 is absorbed by the blue pixel and the green pixel through glue line 3 and color filter layer 4B on panel glass 1, and 4G and fluorescent substance layers 5B and 5G at this time, exposure to the extent that it hardens to the glue line 3 on it is not made. Moreover, the light of the external exposure 23 is intercepted in the light absorption layer 2. Therefore, only a red picture element part will be exposed by the external exposure 23, and a glue line 3 and color filter layer 4R will be hardened. Moreover, red fluorescent substance layer 5R of a red picture element part hardens by the internal exposure 22.

[0058] By drying, after carrying out warm water development of this with 20-25-degree C warm water and removing completely the unexposed part on a blue pixel, a green pixel, and the light absorption layer 2, as shown in drawing 4 I, the red pixel which consists of red color filter layer 4R and red fluorescent substance layer 5R is formed.

[0059] Next, after applying acrylic resin as an interlayer on the fluorescent substance side formed from the blue pixel [which was produced with this thermosensitive imprint film 10], green pixel, and red pixel and making the front face of a fluorescent substance pixel smooth, a metal back layer is formed by vacuum evaporationo of aluminum etc. Then, heat pasting of panel glass 1 and the funnel glass can be carried out, and a color cathode-ray tube can be formed. In addition, in the process of this heat pasting, the organic substance is burned down completely.

[0060] Thus, in the color cathode-ray tube in which the manufactured color filter layer 4 (4B, 4G, 4R) was formed, since outdoor daylight is absorbed in this color filter layer 4 (4B, 4G, 4R) and the reflected light becomes weak, contrast increases. Moreover, it becomes possible to use glass with high permeability T for panel glass 1, and to raise brightness. Therefore, the color picture of the high color purity in high contrast is obtained.

[0061] moreover, since the color filter layer 4 and the fluorescent substance layer 5 can be formed at the process of only an imprint, exposure, development, and desiccation by using the thermosensitive imprint film 10 in this way, as compared with the conventional slurry method, a production process is markedly alike and can be

simplified.

[0062] Moreover, since the burden placed on the light absorption layer 2 by reduction in a routing counter is mitigated as compared with the conventional slurry method, generating of the defect of the light absorption layer 2 is reduced. Therefore, the color filter layer 4 and the fluorescent substance layer 5 which are obtained by the process mentioned above have a good precision of the pattern, and generating of a defect is improved remarkably. Furthermore, since the possibility of mixing of dust or a foreign matter is also reduced, it is hard coming to also generate the defect resulting from these.

[0063] Moreover, in production of a blue pixel, green pixel, and red pixel, there is an advantage which completely does not generate wastewater containing the chromium matter which was a problem conventionally by considering as the photosensitive ingredient which does not contain the chromium which mentioned above the photosensitive component used for the thermosensitive imprint film 10.

[0064] And since constraint of viscosity, dispersibility, spreading nature, etc. is eased by using the thermosensitive imprint film 10 as compared with the slurry method currently conventionally performed in the color filter layer 4 or the fluorescent substance layer 5, it also has the advantage of being easy to adopt the photosensitive ingredient which does not contain chromium.

[0065] Then, the gestalt of other operations of this invention is explained. The gestalt of this operation is the case where the color filter layer and fluorescent substance layer of the same color are formed with the thermosensitive imprint film of an exception object, respectively.

[0066] The outline block diagram (sectional view) of two kinds of thermosensitive imprint films used for drawing 5 in the gestalt of this operation is shown. The 1st thermosensitive imprint film 12 shown in drawing 5 A has the photosensitive glue line 3 and the color filter layer 4 as a part 13 which finally remains, and the other configurations of it are the same as that of the thermosensitive imprint film 10 of drawing 1 . Moreover, the 2nd thermosensitive imprint film 14 shown in drawing 5 B has the photosensitive glue line 3 and the photosensitive fluorescent substance layer 5 as a part 15 which finally remains, and the other configurations of it are the same as that of the thermosensitive imprint film 10 of drawing 1 .

[0067] Also in the gestalt of this operation, like the thermosensitive imprint film 10 of the gestalt of previous operation, it heats and pressurizes and imprints by laminating. The color filter layer 4 is imprinted through a glue line 3 from the 1st thermosensitive imprint film 12, and the fluorescent substance layer 5 is imprinted through a glue line 3 from the 2nd thermosensitive imprint film 14 on this color filter layer 4.

[0068] In addition, although the gestalt of above-mentioned operation showed the configuration which formed the color filter layer 4 in all blue pixels, the green pixels, and red pixels, the configuration which formed the color filter layer only about some colors, i.e., a green pixel, is formed by the green fluorescent substance layer, and a red

pixel and a blue pixel are good also as a configuration formed by the laminated structure of a color filter layer and a fluorescent substance layer.

[0069] In this case, by using the thermosensitive imprint films 12 and 14 of the gestalt of this operation, a green pixel is imprinted and formed from the 2nd thermosensitive imprint film 14 which has the green fluorescent substance layer 5, and from the 1st thermosensitive imprint film 12 which has the color filter layer 4, and the 2nd thermosensitive imprint film 14 which has the fluorescent substance layer 5, a blue pixel and a red pixel can be imprinted, respectively, and can be formed.

[0070] Moreover, when there are a color which forms the color filter layer 4 in this way, and a color which does not form the color filter layer 4, you may make it use the thermosensitive imprint film 10 of drawing 1 , and the thermosensitive imprint films 12 and 14 of the gestalt of this operation properly for every color.

[0071] Therefore, correspondence to the color cathode-ray tube of a configuration of having formed in the phosphor screen the color filter of the configuration in which the color filter of two colors was formed, or monochrome can also be easily performed by selecting and using three kinds of thermosensitive imprint films, blue, green, and red, to compensate for the configuration of a color cathode-ray tube.

[0072] In explanation of the gestalt of above-mentioned operation, although the case where a blue pixel, green pixel, and red pixel was formed using a shadow mask 21 as a color sorting electrode was explained, it is applicable also like the color cathode-ray tube using the color sorting electrode of other configurations. For example, it is applicable to the color cathode-ray tube which forms a blue stripe, green stripe, and red stripe using the slit-like the color sorting electrode, i.e., so-called aperture grille, the color cathode-ray tube using the color sorting electrode of the shape of a rectangular slot, etc.

[0073] Moreover, also in the display of indicating equipments other than a cathode-ray tube, for example, PDP (plasma display panel), LCD (liquid crystal display), FED (field emission mold indicating equipment), etc., it is possible to apply this invention similarly. That is, also in such a display, it is possible to form the color filter layer which constitutes the pattern and pixel of each color, for example, and a fluorescent substance layer by the imprint from a thermosensitive imprint film. In such a display, patterning of imprinted photosensitive glue line 3, color filter layer 4, and the fluorescent substance layer 5 can be carried out by exposing through the mask means corresponding to the pattern of each predetermined color instead of a color sorting electrode.

[0074] And on the display which there is no fluorescent substance layer, for example, and has only a color filter layer, a color filter layer can be formed using the 1st thermosensitive imprint film 12 shown in drawing 5 A.

[0075] This invention is not limited to the gestalt of each above-mentioned operation, and, in addition to this, various configurations can take it in the range which does not deviate from the summary of this invention.

[0076]

[Effect of the Invention] According to above-mentioned this invention, since a production process can be simplified as compared with the formation approach of the color filter layer by the conventional slurry method, it is possible to reduce a manufacturing cost.

[0077] Moreover, it is possible to form the pattern of a color filter layer and a fluorescent substance layer with high precision, and a reliable color cathode-ray tube can be manufactured.

[0078] Moreover, since the photosensitive ingredient which does not contain chromium can be used for the photosensitive ingredient of a thermosensitive imprint film, it becomes possible to completely abolish discharge of the chromium matter in the formation process of a color filter layer and a fluorescent substance layer.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the outline block diagram (sectional view) of the thermosensitive imprint film of the gestalt of 1 operation of this invention.

[Drawing 2] A-D It is process drawing explaining the production process of the color cathode-ray tube using the thermosensitive imprint film of drawing 1 .

[Drawing 3] E-G It is process drawing explaining the production process of the color cathode-ray tube using the thermosensitive imprint film of drawing 1 .

[Drawing 4] H, I It is process drawing explaining the production process of the color cathode-ray tube using the thermosensitive imprint film of drawing 1 .

[Drawing 5] A, B It is the outline block diagram (sectional view) of the thermosensitive imprint film of the gestalt of other operations of this invention.

[Drawing 6] It is the sectional view of the conventional phosphor screen for color cathode-ray tubes.

[Drawing 7] It is the explanatory view of the phosphor screen for color cathode-ray tubes which formed the color filter and improved contrast.

[Description of Notations]

1 Panel Glass, 2 Light Absorption Layer, 3 Photosensitive Glue Line, 4, 4B and 4G, 4R Color Filter Layer, 5, 5B, 5G, 5R (photosensitivity) A fluorescent substance layer, 6 Base film, 7 A cushion layer, 8 A covering film, 9 An antistatic layer, 10 A thermosensitive imprint film, 12 The 1st thermosensitive imprint film, 14 The 2nd thermosensitive imprint film, 21 A shadow mask, 22 Internal exposure, 23 External exposure